ADAPTING WITH ENTHUSIASM: CLIMATE CHANGE ADAPTATION IN THE CONTEXT OF PARTICIPATORY ACTION RESEARCH

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SUB-THEME 2: Towards climate change adaptation in ISLM

ABSTRACT

The challenges of climate variability faced by small-scale farmers in the drylands have always been daunting. Current and predicted climatic changes have already, and will in future exacerbate the extremes of variability and increase the pressures. Adaptation to changing climatic and socio-economic conditions is particularly challenging for producers who have been caught in poverty traps, and who have limited access to scientific knowledge.

Promising results have been achieved by engaging small-scale rooibos tea farmers of the Northern Cape Province of South Africa in gathering and analysing local weather data, providing them with access to scientific information and mobilising their local knowledge and capacities to develop appropriate solutions within an action research context. However, this process is not merely data, knowledge and learning driven: engagement that addresses a range of human needs in a context that generates enthusiasm and strengthens the bonds of mutual support creates the synergies that are needed to rise to extraordinary challenges and advance sustainable land management.

INCREASING RESILIENCE THROUGH DEVELOPING PROBLEM SOLVING CAPACITY

Climate change is likely to affect South Africa severely, and will contribute to negative effects on the agricultural sector (Archer et al 2008). This effect is likely to impact hardest on already vulnerable groups: marginalised groups at the margins with fragile livelihoods. We need to take cognisance of the fact that that livelihoods are not only dependent on climate: a host of factors will determine whether a particular livelihood strategy is successful (Ziervogel, Calder 2003). The challenge in climate change adaptation is therefore twofold: on the one hand we cannot say with certainty what the changed conditions are going to entail, and on the other hand we are dealing with a very complex set of frame conditions (e.g. market access, economic situation, transport, infrastructure, governance, subsidies, etc). In the light of this uncertainty the small-scale farmers of the Suid Bokkeveld decided to explore ways to increase the robustness of their livelihood strategies and thus increase resilience to possible climate change effects on their farming practices.

It has been documented historically that groups that were able to adapt and did not fall into a rigidity trap were able to survive even considerable external changes in frame conditions without huge losses or trauma (Hegmon, 2008; LeMaitre, O'Farrell, 2008). This paper explores some methods to unlock the adaptive capacity of vulnerable groups by fostering problem solving capacity and engendering a positive and empowered attitude using a participatory action research approach.

FIGURE 1: SHARING EXPERIENCES AND INSIGHTS ARE IMPORTANT STEPS TO AN INCREASED PROBLEM SOLVING CAPACITY (PHOTO: B. KOELLE)

THE SUID BOKKEVELD

Climate change predictions in different models vary for Western parts of South Africa. However, temperatures have already risen and there are strong indications that the climate will change in other ways. This might lead to an increased frequency of drought, later onset of the rainy season in the winter rainfall area and more extreme climatic events (higher temperature peaks in summer and possibly stronger frost in winter). It was due to these predictions and a severe drought that

farmers in the Suid Bokkeveld decided they would like to explore the issue of climate change and especially how they could be prepared for the changes to come.

FIGURE 2: ROOBIOS TEA IS AN IMPORTANT LIVELIHOOD STRATEGY IN THE SUID BOKKEVELD (PHOTO: B KOELLE)

Due to its aridity, low fertility and inhospitable nature, the more arid fringes of the Suid Bokkeveld are primarily inhabited by "Coloured" people who are descended from the KhoiSan, former slaves and European settlers. A community of approximately 1,00 people supports itself primarily by working for "white" landowners who claim descent from European settlers, However, a number of "Coloured" land owners and users have succeeded in retaining or gaining access to land. The small-scale rooibos tea farmers of the Suid Bokkeveld pursue diversified livelihood strategies that include small stock (sheep and goats) and participation in the local agricultural labour market.

Since the late 1990s these farmers have organised themselves in an attempt to combat the extreme poverty they face. Due to physical isolation and the long history of social and political oppression that actively discouraged collective action the members of this community had limited experience of collective organisation. Nevertheless in 2001 they formed the Heiveld Co-operative, which is an exporter of organic and fair trade certified rooibos tea.

FIGURE 3: HENDRIK HESSELMAN, A MEMBER OF THE HEIVELD CO-OPERATIVE FINDS THE HEIVELD TEA IN A SUPERMARKET IN PARIS - WHILE VISITING CLIENTS. (PHOTO: B.KOELLE)

Rooibos tea production in this drought-prone western margins of the Karoo plateau in the Northern Cape Province, South Africa can be a hazardous occupation. The area lies within the transition zone between the ecologically significant Fynbos and the Succulent Karoo biomes (Cowling *et al* 1997). The Fynbos Biome is the primary component of the Cape Floristic Region, which is recognized as one of the world's major floristic kingdoms (Cowling *et al* ibid). It comprises 71 337 km ^{2} of the extreme southwestern and southern parts of Southern Africa The biome comprises approximately 7300 species, of which more than 80% are endemic. The Succulent Karoo biome, occupying western arid South Africa and southern Namibia, comprises more than 5000 species, of which more than 50 % are endemic (Milton *et al* 1997). Lying on the transition between these two biomes, the Suid Bokkeveld supports fynbos vegetation on soils derived from Table Mountain Sandstone, and succulents, geophytes and shrubs on the clay loams derived from Bokkeveld and Karoo series sediments. The area receives predominantly winter rainfall of between 150 and 300mm.

FIGURE 4: TRADITIONAL HOUSE IN THE SUID BOKKEVELD: SMALL SCALE FARMERS ARE RELYING ON SUSTAINABLE RESOURCE USE. (PHOTO: B. KOELLE)

The small-scale farmers of the area are descended from the KhoiSan "first people" of South Africa and settlers of primarily European decent. They have experienced systematic and profound disempowerment by colonial settlers and their descendents. What is perhaps more unique is the length to time that they have been subjected to domination, the extent to which their culture has been obliterated and the unique tools of domination applied to ensure that the dominant classes could exploit their labour at little cost. In the rural areas of the Western and Northern Cape Provinces of South Africa the modern descendents of the KhoiSan speak a language derived from Dutch, and remain on the economic fringes of society. Apartheid was officially abolished in 1994, but its legacy lives on in the inequitable social and economic relations in these communities where more that 90% of agricultural land belongs to white land owners, and so-called "Coloured" farmers are confined to the most marginal areas.

One of the many legacies of the KhoiSan is their knowledge of rooibos (ASPALATHUS LINEARIS), an indigenous plant used since pre-historic times to produce a health giving and refreshing beverage. This knowledge was shared with white settlers, who in the 20th Century were able to benefit from the commercial opportunities offered by the growth of an export-oriented industry. The labour to establish the huge plantations of rooibos upon which the industry is based was provided by "Coloured" people, who were prevented from participating in the other benefits of the industry by racially discriminating policies, legislation and other means of exclusion. Those few "Coloureds" who had access to land on which rooibos could be produced (usually only on a small scale) were excluded from markets and state support.

FIGURE 5: WILD ROOIBOS (ASPALATHUS LINEARIS) IN ITS NATURAL HABITAT IN THE FYNBOS BIOME. (PHOTO: B.KOELLE)

The rooibos plant (ASPALATHUS LINEARIS) is endemic to the harsh environment of the mountainous winter rainfall areas of the west of South Africa. Because of its unique soil and climatic requirement and its associations with other biotic components of the ecosystem (bacteria, fungi, pollinators, etc.) rooibos has not been successfully cultivated in other parts of the world, and all demand is supplied from a single production area that is approximately 200 X 100 kilometres in extent. Rooibos has evolved a number of unique adaptations to thrive in its drought-prone, low nutrient habitat. This is a fire-driven eco-system dominated by fynbos (literally "fine leafed") species that are adapted to summer drought.

The leaves and young shoots of rooibos have been used by indigenous peoples of South Africa since pre-history to produce a health-giving beverage known as rooibos tea. Rooibos was originally collected in the wild, and it was only from the early 1900s that the species was cultivated on a commercial basis. This cultivation destroyed many endemic plant communities in which wild rooibos grew. The major research and extension efforts focused on the rooibos industry over the past century have been designed to promote cultivation of rooibos mono-crops at the

cost of endemic populations and species. This has raised the profile of cultivated rooibos and has helped to create an industry that is highly vulnerable to droughts, and thus experiences "boom and bust" cycles of production, with related price instability and market uncertainty.

Widespread cultivation is not possible in rocky areas, but wild rooibos populations flourish here. Using their traditional knowledge, these small-scale farmers produce rooibos tea (both wild and cultivated) and subsistence crops and practice pastoralism with small livestock. Two communities of small-scale farmers in particular have been harvesting wild and cultivated rooibos for decades.

A PARTICIPATORY ACTION RESEARCH APPROACH TO INCREASE RESILIENCE TO CLIMATE CHANGE

Humanity faces unprecedented environmental, economic and social challenges that demand innovative and effective solutions. The natural systems upon which we depend for ecosystem services are infinite complexity, yet have been crudely manipulated by agricultural interventions for survival or material gain, and globally most are in decline, some to the point of collapse. At the local level, global change is impacting negatively on these systems and the services they provide. Under these circumstances farmers must develop a deeper understanding of natural systems to manage them sustainably in a changing world. If they do not understand how ecological systems are likely to be impacted on by global change, or what mitigatory actions they can take, farmers will inevitably exacerbate global environmental problems.

Most land users apply practical reasoning when solving problems. Practical reasoning is characterised by the following elements:

- **Necessity**: Some questions must be answered, as they are both practical and urgent. This is typical of the problems faced by land users on a daily basis.
- **Uncertainty**: The grounds on which these decisions must be made are essentially uncertain (no one can know infallibly whose interests should be consulted, what evidence should be taken into account, or which arguments should be given precedence).
- **Realities**: Decision making must always take histories and current realities into account: it is usually not possible to make a "clean start", as one can in a laboratory when initiating an experiment.
- **Uniqueness**: Each practical question belongs to a specific time and context: precedent can inform, but not determine the decision.
- **Sacrifice**: Competing goals and values have to be taken into consideration: even if an optimal solution is chosen that will result in the satisfaction of a range of needs, some will either not be satisfied, or will not be satisfied fully.

- **Unpredictability**: The outcomes of any decision are never entirely predictable, and even less so are the outcomes of the alternative courses of action that will have to be foregone.
- **Ambiguity of actions**: Practical decisions are based on the anticipated desirability of the expected result, and not necessarily of the act itself (and thus some argue that "the end justifies the means").

The methods of modern science are based upon the Aristotelian school of technical reasoning, which posits the idea of an objective reality which can be examined by means of scientific method in which the responses of the objects of research observed, measured and analysed. However, when applied to the human realm this approach is not only inadequate, but frequently counterproductive because it reduces people to research objects, and fosters perceptions of inequality, exploitation and alienation. This contributes to the associated resentment and mistrust that one may encounters in "over-researched" communities that have been subjected to extractive research that it rooted in this paradigm.

We would argue that if natural and human scientists intend to help farmers improve their management of the natural resources that they control, and to derive greater or sustained benefit from the ecosystem services that they provide, partnerships based on mutual respect and shared concerns are vitally important. This calls for a research paradigm that will incorporate these elements and contribute actively to creating a "community of practice" (Oettle & Koelle 2003) between land users and scientists.

Participatory Action Research practice requires critical reasoning that is informed by practical reasoning, uses the technical reasoning of the natural sciences and is able to transcend them both. PAR is an approach that actively involves all relevant players (especially those who are usually disregarded (women and the poor), intervenes and acts to improve the situation that is being researched (and not just observing it) and involves a process of research process in which knowledge is developed, abilities to solve problems are enhanced and theory is critically reviewed in an on-going process of action and reflection.

Figure 6: Participatory Video has been used as a powerful tool of reflection and learning. (Photo: B.Koelle)

Within Participatory Action Research processes the research agenda is open and is developed collaboratively with all role players. The values that underpin and inform the process, interactions and transactions that take place are explicit and not just assumed, so as to ensure that role players are able to participate fully and without suspicion of manipulation or hidden agendas. The research process is not an extractive one: instead, data is gathered and analysed in ways that are inclusive. Responsibility for the process and outcomes is shared by all participants, and the research process is open to influence and (if necessary) re-design by all participants

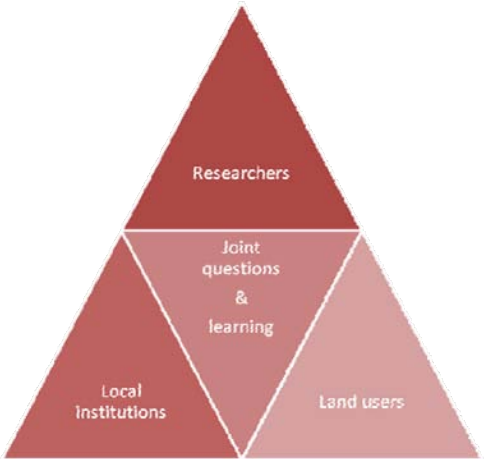

FIGURE 7: THE PARTICIPATORY ACTION RESEARCH APPROACH IS BASED IN JOINT DEVELOPMENT OF RESEARCH QUESTIONS, JOINT ANALYSIS AND JOINT ACTION PLANNING

"**Participatory Action Research is a methodology that aims to bring about improvement ... by activating in the people involved in the situation a learning cycle**" Buellow (1989)

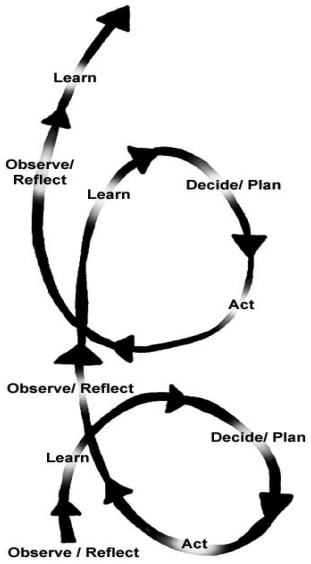

FIGURE 8: LEARNING SPIRAL IN ACTION RESEARCH.

Armson and Ison (2001) argue that *enthusiasm* is a phenomenon at the core of social life. The emotion or driving force of enthusiasm has long been recognized as central in psychology. Motivation is understood as a "drive from within" that then is satisfied by whatever action a person is taking. Armson and Ison (ibid) have shown that providing people with the experience of being actively listened to while recounting stories of their past, present and anticipated future was a route to triggering enthusiasm. The action research process in the Suid Bokkeveld has drawn on this notion of the telling of histories and envisaging the future as ways of eliciting the necessary enthusiasm and energy to drive the processes of adaptation. By taking the initiative and initiating measures and actions to enhance resilience, people are able to take ownership of the adaptation process.

Figure 9 Discussing strategies of adaptation. (Photo: B Koelle)

Exploring adaptation opportunities in the Suid Bokkeveld – Wild Rooibos Case Study

Farmers in the Suid Bokkeveld decided at a community workshop to explore local weather patterns and to engage with and test seasonal forecasts. Especially seeing that the livelihood strategies are often complex, and local micro-climate can vary strongly from farm to farm, it was decided to embark on an integrated process including monitoring of local weather patterns, engaging with seasonal forecasts and long range forecasts, exploring existing and new adaptation strategies in an action research approach and to steer this process with quarterly report back and reflection workshops. It is crucial to emphasise that this process did not take place in isolation but was rather integrated in a larger development process in the Suid Bokkeveld, taking cognizance of the multiple stress factors farmers are facing in devising their most robust livelihood strategy. It is crucial to integrate adaptation with development.

Seasonal forecasts and monitoring of weather patterns

Four different farmers volunteered to monitor the local weather with a simple digital max min thermometer and a rain gauge at their homes. It was agreed that the monitoring would take place every Monday morning for the maximum and minimum temperatures of the week, as well as precipitation on a daily basis. This data is recorded in "Climate Diaries" detailing the following information for each month:

- Weekly minimum and maximum temperatures
- Rainfall events and mm
- Observation
- Farming activities of the month
- Planning for the next month

The actual weather data collected was then compared to the seasonal forecast prediction for the respective timeframe. This allowed for a better understanding of the seasonal forecast and an increased awareness how particular weather patterns would impact on farming approaches, disaster management and livelihood strategies.

Figure 10 Children actively assist in the presentation of the Seasonal Climate Forecast. (Photo: B Koelle)

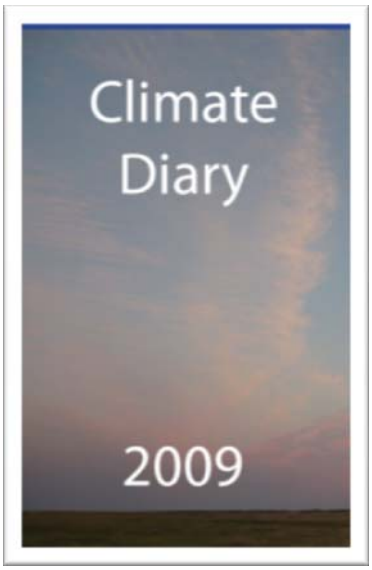

FIGURE 11 ALL LOCAL MONITORING RESULTS ARE RECORDED IN A CLIMATE DIARY. (PHOTO: B KOELLE)

LIFEWORLD OF FARMERS AND STRATEGIES TO RESPOND TO DROUGHT

Qualitative narrative interviews were conducted with farmers from the Suid Bokkeveld to explore farmers' life worlds, their perception of climate and possible climate change and the possible response strategies of farmers under different climate scenarios. These interviews were transcribed and analysed with NVIVO software. In the interviews many farmers stressed that they considered climate change as a serious challenge for the future, but noted that it was by no means the only one or necessarily the most important one. Other reasons cited were market access, economic climate, infrastructure, access to healthcare facilities and schools etc. This matches observations made in other communities (e.g Lesotho - Ziervogel et al, 2003). The sharing of these narratives engendered engagement and even enthusiasm for active adaptation on the part of the respondents.

PROPAGATION OF WILD ROOIBOS AS AN ADAPTATION STRATEGY

Wild rooibos tea has been recorded to be more resilient to pests and droughts and to be longer lived than the cultivated rooibos tea. As the Heiveld Co-operative provides a marketing channel for the wild and sustainably harvested rooibos tea, there has been an increased interest in the propagation of wild rooibos (Louw 2006). This was further fostered through the high mortality of cultivated tea in the intense drought of 2003-2006.

In an action research approach farmers decided in a climate preparedness workshop that:

1. Seed should be collected in four different areas, that the seed would be scarified with different methods and tested
2. This seed would be planted under controlled nursery conditions in a greenhouse of the University of Cape Town

3. It would be compared to seed planted on an open air nursery on a farm in the Suid Bokkeveld.

The participating researcher and farmers used the same methods to record the survival rate of the seedlings, and actively compared and analysed the data while monitoring. This led to other approaches suggested by the farmers being tested as a part of the learning process: low temperature burning of plant material on the soil surface under old wild rooibos bushes, as well as under nursery conditions. The suggestions were implemented and scientifically documented in partnership between scientists and farmers. The farmers and scientists discussed the results, possible analysis and decided on next steps in the quarterly climate preparedness workshops.

Climate change preparedness workshops

The core of the climate change adaptation process is the quarterly climate change preparedness workshops, conducted every 3 months and providing a platform for reporting back to the larger community, to share new ideas with fellow farmers and scientists, and plan next steps. Importantly the workshops fulfil a host of needs and are also social events to exchange personal and farming news and experiences outside the formal programme (Max-Neef, 1991). Designing the workshops in a way that they become events that enable participants to satisfy their basic needs, including those for understanding (learning), subsistence, participation, understanding, idleness, protection and identity is crucial to maintain the momentum of the entire process.

Parallel to the climate change preparedness workshop for adults, workshops are held for children. The children's workshops were instituted after the idea emerged during the evaluation of a previous workshop. The innovation has been taken up with a lot of enthusiasm by the children and provides a platform for them to learn about climate change actively, while the adults can focus on their workshop process. The sharing of lessons learnt between the participants of both workshops is important as it provides rich opportunities for learning and focuses the attention on different perceptions of the generations.

Figure 12: Presentation from the Children's workshop: How parents and young persons can have different views on climate change (Photo: B Koelle)

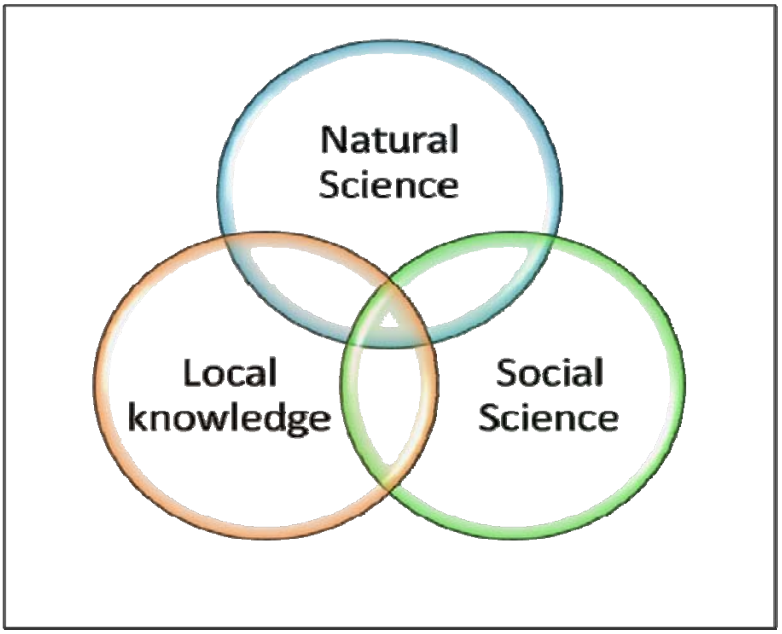

FIGURE 13: IT IS CRUCIAL TO INCREASE TRANS-DISCPLINARY SYNERGIES TO SUPPORT FARMERS IN THE DEVELOPMENT OF THEIR PROBLEM SOLVING CAPACITY. LIVELIHOOD STRATEGIES ARE ALWAYS CROSS CUTTING - AND SHOULD THUS BE ADDRESSED BY THE RESEARCH PROCESS

INCREASING RESILIENCE WITH ENTHUSIASM – SOME CONCLUDING REFLECTIONS

Adaptation is place based and requires specific strategies. In order to create an enabling environment for adaptation it is important to firstly create the determination to adapt, and secondly create co-operation and networks to foster adaptation processes (Leary 2008). The participatory action research process and the development of local and national networks has contributed towards creating a more enabling environment for adaptation in the Suid Bokkeveld.

The experiences of sharing life stories, experiences, insights and visions for the future within the participatory action research process are a significant driver in the process of pro-active adaptation, which has been described as the “stitch in time” approach. These responses are characterised by enthusiasm on the part of the participants. On the other hand, reactive adaptation that is driven by outside service providers requires far greater effort (the “nine” stitches) and is far less likely to be sustained because ownership of the process and its outcomes will be diminished.

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